New York City, USA

New York City tackles the urban heat island effect in its most vulnerable communities

Through in-depth research and data analysis, New York City has found that historically marginalized neighborhoods are the most impacted by heat-related effects of climate change. Building on existing efforts, the Mayor's Office of Recovery and Resiliency released the Cool Neighborhoods strategy that shows a coordinated approach to cooling vulnerable communities through a series of initiatives and a strong commitment to monitoring.

Community members volunteer to paint roofs white.

What are the key lessons learned?

More New Yorkers die from heat-related effects than any other natural occurrence. That being said, not all neighborhoods are affected in the same way by climate-related issues. Data patterns in NYC show that the neighborhoods most vulnerable to extreme heat align with those neighborhoods that have been historically marginalized. These neighborhoods and their residents typically lack the resources to keep cool and comfortable in summer months. Without the necessary resources, these neighborhoods are increasingly vulnerable to rising temperatures and extreme heat days. Fortunately, there are proven strategies to mitigate urban heat risks. Cool Neighborhoods, a program from New York City, created a range of initiatives to help its most vulnerable communities mitigate the effects of heat and improve livability, health, and wellness.

The NYC Mayor's Office of Recovery and Resiliency (ORR) released the Cool Neighborhoods report in 2017 to share targeted initiatives designed to help its most vulnerable communities adapt to and mitigate heat effects. The goals of the Cool Neighborhoods program include:

- **Keeping New Yorkers safe on hot days:** to reduce heat impact and heat-related deaths through awareness and support.

- **Making surfaces more reflective:** to absorb less heat and reduce the local ambient air temperature.

- **Adding vegetation:** to increase evapotranspiration and reduce ambient air temperatures and improve air quality.

The program was informed by a study conducted by researchers at Columbia University and the Department of Health titled "A Case-Only Study of Vulnerability to Heat Wave-Related Mortality in New York City". The study spatially analyzed climate and health-related vulnerabilities in NYC and developed the Heat Vulnerability Index (HVI); an index which enabled the identification of areas most at risk in the city.

A key objective of the Cool Neighborhoods program was to raise awareness of available initiatives and aid targeted communities through the implementation of the proposed strategies. The City determined that it was important to have trusted messengers from the community to ensure that the communities would listen to and adopt the messages. Through engaging with community-based organizations, the City works with community institutions such as religious centers and schools, as means of community outreach and education.

One of the most important components of the program is the efforts on monitoring. The Cool Neighborhoods program introduces several strategies to collect, analyze, and monitor data in order to better understand and track heat vulnerabilities in NYC. Not only do these strategies help to understand the impacts, they also help to make the argument for future funding and program expansions.

Climate

As a part of the City's larger OneNYC effort and the commitment to reducing GHG emissions by 80% by 2050, Cool Neighborhoods NYC tackles heat adaptation and mitigation in NYC. Through tree plantings, low albedo pavements and rooftops, and raised awareness of heat risks, the City is working to reduce local ambient temperatures and heat related deaths in the City.

Inclusivity

Before the Cool Neighborhoods program, several heat adaptation and mitigation initiatives existed however, they were only accessible to those who were aware of their existence and understood the process. A major objective of Cool Neighborhoods is to connect existing initiatives with the City's most vulnerable communities to heat stress and to create new initiatives with a specific focus in these neighborhoods.

Case Study Type:	Program	Primary Sector:	Adaptation
ICA Pillar:	Impact	Primary Impact:	Health

How might these lessons be used in your City?

### Identify those most vulnerable to climate events and those most in need of support

On any given day, New York City's Mayor's Office of Recovery and Resiliency (ORR), Emergency Management Services, and Department of Health, among other agencies, are working to protect New Yorkers from climate risks. To be able to allocate resources effectively, it is key for the City to understand who and where the most vulnerable populations are. The Cool Neighborhoods strategy used findings from the report "A Case-Only Study of Vulnerability to Heat Wave-Related Mortality in New York City"[1] as a basis for identifying heat vulnerability in NYC. The report defined and mapped the Heat Vulnerability Index (HVI), or a composite score based on certain variables, including daytime summer surface temperatures, the amount of green space, poverty, and race.

Heat Vulnerability Index

As defined in "A Case-Only Study of Vulnerability to Heat Wave-Related Mortality in New York City," the Heat Vulnerability Index (HVI) began the conversation around who in NYC is most vulnerable to climate events based on health and social parameters. In mapping the HVI, the researchers analysed census tracts across the City as the basis for the index. Each census tract in the US is monitored with updated demographic and economic data for populations every ten years. The HVI is essentially a composite score calculated for each census tract based on: the proportion of homes receiving public assistance (low-income), the proportion of non-Hispanic black residents, the proportion of overall deaths occurring in the home, the relative surface temperature, and the proportion of trees. The HVI is intended to provide a quick assessment of which areas in NYC are most susceptible to climate events and least likely to recover quickly or receive the resources and assistance they need.

The Cool Neighborhoods strategy used the Heat Vulnerability Index to determine where initiatives should be targeted for the residents that are most vulnerable. Ultimately, NYC's most heat vulnerable areas include the South Bronx, Northern Manhattan, and Central Brooklyn, as shown in the map below[2].

Low vulnerability

Moderate vulnerability

High vulnerability
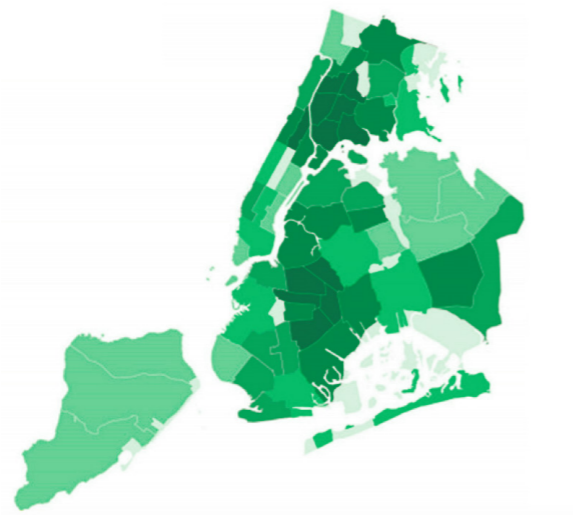
Get buy-in from multiple stakeholders

Beginning in 2015, ORR began to formulate a plan that would later become Cool Neighborhoods NYC through facilitated engagement with an Urban Heat Island Mitigation Working Group. The working group was made up of agency representatives, community organizations, and researchers, who helped the City identify and select heat-related strategies. In developing strategies, the working group first took inventory of existing City agency initiatives that could be supported or added to with the Cool Neighborhoods effort. This collaborative cross-agency approach helped to create a holistic and coordinated solution to heat impacts in NYC.

ORR crafted the policy behind Cool Neighborhoods NYC with a variety of City agencies, including NYC Parks, the Department of Health, Small Business Services, and Emergency Management, who were responsible for implementation. Each initiative began with understanding the context and the data as it relates to vulnerability.

Make community outreach a key component

The next step for each initiative was outreach and engagement. A key priority for Cool Neighborhoods is to ensure that residents in these communities know what resources are available and that they are actively engaging in the initiatives. Some of the Cool Neighborhood initiatives are solely focused on community engagement and outreach such as Be a Buddy NYC, climate risk training for home health aides, and the engagement with health and weather reporters to ensure proper messaging of heat risks and protection. Be A Buddy, for example, creates a network of volunteers who will check in on residents, particularly the elderly, during heat waves and refer them back to City services. While the more physical initiatives range from planting trees to coating roofs.

NYC °CoolRoofs

Launched in 2009, the NYC °CoolRoofs initiative pre-dated the Cool Neighborhoods effort. However, as part of the Cool Neighborhoods strategy, the program will target heat vulnerable neighborhoods for the next few years. The initiative, led by the NYC Department of Small Business Services, provides the opportunity for building owners to have their roofs coated with a white, reflective coating at no cost to little cost, depending on the building use type. The white coating can reduce internal building temperatures by up to 30% during warm months and reduces cooling energy needs and costs within the building. As a part of the initiative, the City hires local New Yorkers and trains them as a way to engage communities. The main annual goals of the initiative are to coat 1,000,000 square feet of rooftops, train 70 workforce participants for 10 weeks, and host multiple "Community Coating Days" to provide opportunities for the public to volunteer. As of Summer 2017, the NYC °CoolRoofs initiative has coated 6,730,299 square feet of roofs, engaged 5,934 volunteers, and saved nearly 2,680 metric tons of CO2 emissions[3].

Using data to help vulnerable communities

2,680 tons of emissions avoided

Increased social cohesion

Reduced overall energy costs

Outreach
Increased awareness of urban heat risks

Roof coating
Up to 30% reduced internal temperature

Tree planting
Reduced ambient air temperature

Climate & health research: Vulnerability to heat wave-related mortality in New York City

Vulnerability mapping: Identification of communities most at risk via Heat Vulnerability Index (HVI)

Data monitoring: Measuring neighborhood-level data to focus programs

Be a Buddy NYC and Climate Risk Training for Home Health Aides

The Be a Buddy and Climate Risk Training for Home Health Aides initiatives were introduced with the release of the Cool Neighborhoods report. These initiatives were created as community resources to ensure that general community members and professionals alike, are aware of heat risks and are equipped to help. Through Be a Buddy NYC, the City is promoting social cohesion. Partnering with community-based organizations, the City is developing a new support infrastructure focused on extreme weather preparedness, safety messaging, and check-ins to help those most at risk during extreme weather events. The Climate Risk Training for Home Health Aides uses courses and training materials to provide continuing education to home health aides, ensuring they will become better prepared to recognize and address early signs of heat-related illness. Both initiatives mobilize community members to look out for each other in the case of extreme heat events.

The program will include data collection and analysis to better understand the effects of each initiative. Based on the results, the City will be able to assess which projects warrant further funding and what improvements might be taken for each project in future rounds of implementation.

Monitor data for continued program improvement

A major component of the Cool Neighborhoods program is to monitor, collect, and assess existing and new climate and health-related datasets in NYC. This includes measuring neighborhood-level temperatures, modelling scenarios to show the effects of green infrastructure and other interventions, collecting updated LiDAR survey data for NYC for more accurate 3-D topographic and vegetation-based mapping. Another benefit to monitoring such datasets is that it prepares the City for future funding requests and allows them to be vigilant about which neighborhoods are most vulnerable and most at risk to heat events.

Coordinate already existing efforts

Acting as an umbrella effort overseeing multiple initiatives, ORR utilized existing and available funding for the Cool Neighborhood program.

The entire Cool Neighborhoods effort was supported with a dedicated $106M investment from the City.

What makes this program particularly exemplary is its push for City agency collaboration around a common goal of addressing heat vulnerabilities and extending outreach. This effort, while essential, was no small feat and continues to be a challenge as each agency has its own priorities and urgencies.

Project milestones

March 2015: Study published by the NYC Department of Health and Mental Hygiene and Columbia University researchers defining the Heat Vulnerability Index

2015 – 2016: Urban heat island working group engagement and meetings to identify strategies

June 2017: Cool Neighborhoods published and kick-off

2017: Implementation of initiatives begins (each strategy with its own implementation plan)

2021: Initial phase of Cool Neighborhoods ends

Listen for feedback

Community-based organizations on the ground, who have years of experience engaging with these communities, keep the City accountable to delivering quality impacts. As Cool Neighborhoods continues to progress, the data collected and analyzed will allow the City to be better informed to make more effective decision-making.

ORR and relevant agencies look forward to continued support for the initiatives and potential expansion of some of the initiatives. Continued monitoring remains critical to the ongoing success of the initiative. Up to date data will allow for more accurate and timely evidence-based decision making. The community-focused mission of Cool Neighborhoods is dedicated to improving New Yorkers' livelihood and safety and will continue on with further program expansion, climate and health data monitoring, and growing community awareness and engagement.

References

1   http://www.nyc-eja.org/wp-content/uploads/2018/04/NYC-Climate-Justice-Agenda-Final-042018-1.pdf

2   https://www1.nyc.gov/assets/orr/pdf/Cool_Neighborhoods_NYC_Report_FINAL.pdf

3   https://coolroofs.org/documents/NYC_CoolRoofs_6-14-17_Presentation.pdf